## IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A method for transmitting a packet comprising:

transmitting an orthogonal frequency division multiplexed packet preamble including a long packet preamble and a signal header field readable by both high-throughput communication stations and standard-throughput communication stations, and transmitting an additional training field readable by the high-throughput communication stations;

transmitting training tones over a plurality of spatial channels during ~~a first portion of an orthogonal frequency division multiplexed~~ the long packet preamble, the training tones being interspersed among subcarrier frequencies of the spatial channels; and

retransmitting the training tones during the additional training field ~~a second portion of the packet preamble~~, the training tones being shifted among the subcarrier frequencies of the spatial channels during retransmission,

wherein the signal header field includes packet rate and length information, the signal header field being readable at least by the standard throughput communication stations and causing the standard throughput communication stations to refrain from transmitting during a length of the packet.

2. (Currently Amended) The method of claim 1 wherein each of a plurality of antennas is associated with one of the spatial channels, the spatial channels having differing multipath characteristics comprising a plurality of orthogonal subcarriers, each subcarrier having a null at substantially a center frequency of the other subcarriers of an associated channel,

wherein the training tones are transmitted on a first set of the orthogonal subcarriers of the spatial channels during the long ~~first portion of the~~ packet preamble, and

wherein the training tones are transmitted on a second set of the orthogonal subcarriers during the additional training field ~~second portion of the packet preamble~~, the second set of subcarriers comprising substantially different subcarriers than the first set.

3. (Currently Amended) The method of claim 1 further comprising prior to retransmitting, shifting the training tones to differing subcarrier frequencies of the spatial channels for retransmission, the differing subcarrier frequencies having not been used for transmission during the long ~~first portion of the~~ packet preamble.

4. (Currently Amended) The method of claim 3 wherein during the additional training field ~~second portion of the packet preamble~~, the training tones are shifted by either one, two or three positions when four antennas are used for transmitting.

5. (Currently Amended) The method of claim 1 wherein the training tones comprise a single known orthogonal training sequence,

wherein the training sequence is initially transmitted during the long ~~first portion of the~~ packet preamble, and

wherein the training sequence is retransmitted during the additional training field ~~second portion of the packet preamble~~.

6. (Currently Amended) The method of claim 1 wherein the training tones comprise a known training sequence,

wherein the training sequence transmitted during the long packet preamble ~~first portion~~ comprises two or more repeated subsequences, and

wherein the training sequence transmitted during the additional training field ~~second portion~~ comprises two or more repeated subsequences.

7. (Currently Amended) The method of claim 1 ~~further comprising transmitting training tones in subsequent portions of the packet preamble, wherein a number of portions of the packet preamble comprising the training tones corresponds to a number of transmit antennas.~~ wherein the standard throughput communication stations perform a channel estimate based on the training tones transmitted in the during the long packet preamble, and

wherein the high throughput communication stations perform a channel estimate for the plurality of spatial channels based on the training tones transmitted during both the long packet preamble and the additional training field.

8. (Currently Amended) The method of claim 5 wherein the transmitting and retransmitting are performed by a high-throughput transmitting station, and wherein a high-throughput receiving station is to receive at least the long packet preamble and the additional training field ~~first and second portions of the packet preamble~~ and is to perform a channel estimation for the spatial channels based on the known training sequence.

9. (Original) The method of claim 8 wherein the high-throughput receiving station comprises a plurality of receive antennas, each receive antenna corresponding to one of the spatial channels, and wherein the high-throughput receiving station combines data bits from each spatial channel to generate a demodulated orthogonal frequency division multiplexed symbol.

10. (Original) The method of claim 8 wherein the high-throughput receiving station comprises a single receive antenna to processes the signals from the spatial channels, the high-throughput receiving station to perform signal processing to separate data symbols transmitted on each spatial channel and to combine data bits from each spatial channel to generate a demodulated orthogonal frequency division multiplexed symbol.

11. (Currently Amended) The method of claim 8 wherein a standard-throughput communication station having a single receive antenna receives at least the long packet preamble and the signal header field ~~first and second portions of the packet preamble,~~ and ~~wherein the standard-throughput communication station~~ sets a network allocation vector ~~in response to processing of the training tones~~ and refrains from transmitting during a subsequent predetermined time frame.

12. (Currently Amended) The method of claim 1 further comprising transmitting a data unit portion of the orthogonal frequency division multiplexed packet following the additional training field ~~first and second portions of the preamble~~, and

wherein for high-throughput operation, the data unit portion comprises data symbols transmitted on the subcarriers of each spatial channel to achieve a higher throughput, each spatial channel having separate data streams transmitted thereon.

13. (Original) The method of claim 12 wherein for lower packet error rate operations, the data unit portion comprises identical data symbols transmitted on corresponding subcarriers of each spatial channel, each spatial channel having substantially identical data streams transmitted thereon, and

wherein for medium throughput and medium packet error rate operations, the data unit portion comprises identical data symbols transmitted on corresponding subcarriers of at least some of the spatial channels and comprises different data symbols transmitted on at least some others of the spatial channels.

14. (Original) The method of claim 12 wherein for lower packet error rate operations, the data unit portion comprises linear combinations of spatial streams transmitted on corresponding subcarriers of each spatial channel, and

wherein for medium throughput and medium packet error rate operations, the data unit portion comprises linear combinations of spatial streams transmitted on corresponding subcarriers of at least some of the spatial channels and comprises different data symbols transmitted on at least some others of the spatial channels.

15. (Currently Amended) A method for receiving a packet comprising:

receiving an orthogonal frequency division multiplexed packet preamble including a long packet preamble and a signal header field readable by both high-throughput communication stations and standard-throughput communication stations, and receiving an additional training field readable by the high-throughput communication stations;

receiving training tones transmitted over a plurality of spatial channels during ~~a first portion of an orthogonal frequency division multiplexed~~ the long packet preamble, the training tones being interspersed among subcarrier frequencies of the spatial channels;

receiving the training tones retransmitted over the spatial channels during the additional training field ~~a second portion of the packet preamble~~, the training tones being interspersed among other subcarrier frequencies of the spatial channels during the additional training field ~~second portion~~; and

performing a channel estimation for the spatial channels based on the training tones received in both the long packet preamble and the additional training field ~~portions of the packet preamble~~,

wherein the signal header field includes packet rate and length information, the signal header field being readable at least by the standard throughput communication stations and causing the standard throughput communication stations to refrain from transmitting during a length of the packet.

16. (Currently Amended) The method of claim 15 wherein the channel estimation is performed for the subcarriers of each spatial channel based on the training tones received on associated subcarriers of the spatial channels,

wherein the method further comprises performing an interpolation to determine channel estimates for subcarriers not having a training tone transmitted thereon ~~during either portion of the packet preamble~~, ~~and~~

wherein the training tones comprise a known training sequence,

wherein the standard throughput communication stations perform a channel estimate based on the training tones transmitted in the during the long packet preamble, and

wherein the high throughput communication stations perform a channel estimate for the plurality of spatial channels based on the training tones transmitted during both the long packet preamble and the additional training field.

17. (Original) The method of claim 16 wherein performing the interpolation comprises performing an interpolation to determine channel coefficients at zero tones on each of a plurality of transmit antennas.

18. (Original) The method of claim 17 wherein a high-throughput communication station receives the training tones and performs the channel estimation, and wherein the method further comprises:

demodulating an orthogonal frequency division multiplexed data symbol transmitted over the spatial channels by separately processing signals received through each of the spatial channels.

19. (Currently Amended) The method of claim 16 wherein the reception of the training tones in the lock packet preamble is performed by a standard-throughput communication station having a single receive antenna and wherein the method further comprises:

the standard-throughput communication station setting a network allocation vector in response to receipt of the signal header field ~~processing the training tones~~; and

the standard-throughput communication station refraining from transmitting during a subsequent predetermined time frame based on the network allocation vector.

20. (Currently Amended) The method of claim 14 wherein the high-throughput communication station is a high-throughput receiving communication station having a receive antenna associated with each of the spatial channels, and

wherein the method further comprises performing an association with a high-throughput transmitting station to inform the transmitting station that the receiving station has a plurality of antennas to receive over a corresponding plurality of spatial channels.

21. (Currently Amended) A high-throughput communication station comprising:

a transmitter to transmit an orthogonal frequency division multiplexed packet preamble including a long packet preamble and a signal header field readable by both high-throughput communication stations and standard-throughput communication stations, and transmit an

additional training field readable by the high-throughput communication stations, wherein the ~~a~~ transmitter is configured to transmit training tones over a plurality of spatial channels during ~~a first portion of an orthogonal frequency division multiplexed~~ the long packet preamble, the training tones being interspersed among subcarrier frequencies of the spatial channels, the transmitter to retransmit the training tones during the additional training field ~~a second portion of the packet preamble~~, the training tones being shifted among the subcarrier frequencies of the spatial channels during retransmission; and

a processor to shift the training tones to differing subcarrier frequencies of the spatial channels for the retransmission by the transmitter during the additional training field, the differing subcarrier frequencies comprising subcarrier frequencies not used for transmission during the long ~~first portion of the~~ packet preamble,

wherein the signal header field includes packet rate and length information, the signal header field being readable at least by the standard throughput communication stations and causing the standard throughput communication stations to refrain from transmitting during a length of the packet.

22. (Original) The communication station of claim 21 further comprising a plurality of antennas,

wherein each antenna is associated with one of the spatial channels,

wherein the spatial channels have differing multipath characteristics of a single orthogonal frequency division multiplexed channel comprising a plurality of orthogonal subcarriers, and

wherein each subcarrier has a null at substantially a center frequency of the other subcarriers of the orthogonal frequency division multiplexed channel.

23. (Currently Amended) The communication station of claim 21 wherein the training tones comprise a single known orthogonal training sequence,

wherein the transmitter is to initially transmit the training sequence during the long ~~first portion of the~~ packet preamble, and

wherein the transmitter is to retransmit the training sequence during the additional training field ~~second portion of the packet preamble~~.

24. (Currently Amended) The communication station of claim 21 wherein the transmitter is to transmit a data unit portion of the orthogonal frequency division multiplexed packet following the additional training field ~~first and second portions of the preamble~~,

wherein for high-throughput operation, the data unit portion comprises data symbols transmitted on the subcarriers of each spatial channel to achieve a higher throughput, each spatial channel having separate data streams transmitted thereon,

wherein for lower packet error rate operations, the data unit portion comprises identical data symbols transmitted on corresponding subcarriers of each spatial channel, each spatial channel having substantially identical data streams transmitted thereon, and

wherein for medium throughput and medium packet error rate operations, the data unit portion comprises identical data symbols transmitted on corresponding subcarriers of at least some of the spatial channels and comprises different data symbols transmitted on at least some other of the spatial channels.

25. (Currently Amended) A high-throughput communication station comprising:

a receiver to receive an orthogonal frequency division multiplexed packet preamble including a long packet preamble and a signal header field readable by both high-throughput communication stations and standard-throughput communication stations, and receive an additional training field readable by the high-throughput communication stations, wherein the [[a]] receiver is configured to receive training tones transmitted over a plurality of spatial channels during ~~a first portion of an orthogonal frequency division multiplexed~~ the long packet preamble, the training tones being interspersed among subcarrier frequencies of the spatial channels, the receiver to receive the training tones retransmitted over the spatial channels during the additional training field ~~a second portion of the packet preamble~~, the training tones being interspersed among other subcarrier frequencies of the spatial channels during the additional training field ~~second portion~~; and

a processor to perform a channel estimation for the spatial channels based on the training tones received in both the long packet preamble and the additional training field, ~~portions of the packet preamble~~

wherein the signal header field includes packet rate and length information, the signal header field being readable at least by the standard throughput communication stations and causing the standard throughput communication stations to refrain from transmitting during a length of the packet.

26. (Original) The communication station of claim 25 further comprising a plurality of receive antennas,

wherein each receive antenna is associated with one of a plurality of spatial channels,

wherein the spatial channels have differing multipath characteristics of a single orthogonal frequency division multiplexed channel comprising a plurality of orthogonal subcarriers,

wherein each subcarrier has a null at substantially a center frequency of the other subcarriers of the orthogonal frequency division multiplexed channel, and

wherein the processor is to combine data bits from the spatial channels to generate a demodulated orthogonal frequency division multiplexed symbol.

27. (Currently Amended) The communication station of claim 26 wherein the training tones comprise a single known orthogonal training sequence,

wherein the receiver is to initially receive the training sequence during the long ~~first portion of the~~ packet preamble, and

wherein the receiver is to receive the training sequence for a second time during the additional training field ~~second portion of the packet preamble~~.

28. (Currently Amended) The communication station of claim 25 further comprising a single receive antenna to processes signals received from the spatial channels, ~~and~~

wherein the processor is to perform signal processing to separate data symbols transmitted on each spatial channel and to combine data bits from each spatial channel to generate a demodulated orthogonal frequency division multiplexed symbol.

29. - 32 (Cancelled)

33. (Currently Amended) A computer-readable ~~machine-readable~~ medium that ~~provides~~ stores instructions, which when executed by one or more processors, cause the processors to perform operations for transmitting a packet, the operations comprising:

transmitting an orthogonal frequency division multiplexed packet preamble including a long packet preamble and a signal header field readable by both high-throughput communication stations and standard-throughput communication stations, and transmitting an additional training field readable by the high-throughput communication stations;

transmitting training tones over a plurality of spatial channels during ~~a first portion of an orthogonal frequency division multiplexed~~ the long packet preamble, the training tones being interspersed among subcarrier frequencies of the spatial channels; and

retransmitting the training tones during the additional training field ~~a second portion of the packet preamble~~, the training tones being shifted among the subcarrier frequencies of the spatial channels during retransmission,

wherein the signal header field includes packet rate and length information, the signal header field being readable at least by the standard throughput communication stations and causing the standard throughput communication stations to refrain from transmitting during a length of the packet.

34. (Currently Amended) The computer-readable ~~machine-readable~~ medium of claim 33 wherein the instructions, when further executed by one or more of the processors cause the processors to perform operations, comprising performing a channel estimation for each of the spatial channels based on a known training sequence comprising the training tones.

35. (Currently Amended) The computer-readable ~~machine-readable~~ medium of claim 33 wherein the instructions, when further executed by one or more of the processors cause the processors to perform operations further comprising transmitting a data unit portion of the orthogonal frequency division multiplexed packet following the additional training field ~~first and second portions of the preamble~~,

wherein for high-throughput operation, the data unit portion comprises data symbols transmitted on the subcarriers of each spatial channel to achieve a higher throughput, each spatial channel having separate data streams transmitted thereon,

wherein for lower packet error rate operations, the data unit portion comprises identical data symbols transmitted on corresponding subcarriers of each spatial channel, each spatial channel having substantially identical data streams transmitted thereon, and

wherein for medium throughput and medium packet error rate operations, the data unit portion comprises identical data symbols transmitted on corresponding subcarriers of at least some of the spatial channels and comprises different data symbols transmitted on at least some others of the spatial channels.